

AMENDMENTS TO THE CLAIMS:

1-12. (canceled)

13. (currently amended) A medical method comprising:

providing a carrier holding a multiplicity of electromechanical transducers;

placing said carrier and a patient adjacent to one another so that said transducers are disposed in effective pressure-wave-transmitting contact with the patient;

supplying a first plurality of said transducers with electrical signals of at least one pre-established ultrasonic frequency to produce first pressure waves in the patient;

receiving, via a second plurality of said transducers, second pressure waves produced at internal tissue structures of the patient in response to said first pressure waves;

performing electronic 3D volumetric data acquisition by solely an electronic scanning of said internal tissue structures; and

performing electronic 3D imaging of said internal tissue structures in part by analyzing signals generated by said second plurality of said transducers in response to said second pressure waves,

at least one of the supplying and receiving steps being executed to effectuate the electronic scanning of said internal tissue structures via a plurality of data gathering apertures each including a plurality of said transducers,

the performing of said electronic 3D data acquisition including generating a plurality of tissue-scanning beams via respective ones of said data-gathering apertures to capture or produce structural data pertaining to said internal tissues,

the performing of electronic 3D imaging including coherently combining the structural data generated via said transducers from said data-gathering apertures.

14. (original) The method defined in claim 13 wherein the electronic scanning is accomplished by varying a time delay of said electrical signals across said first plurality of said transducers to effectuate a phased-array electronic scanning of internal tissues of the patient by said first pressure waves.

15. (original) The method defined in claim 14 wherein the varying of the time delay of said electrical signals includes operating switching circuitry operatively connected to said first plurality of said transducers.

16. (original) The method defined in claim 13 wherein the electronic scanning is accomplished by varying sampling time or phase of said second plurality of said transducers.

17. (original) The method defined in claim 16 wherein the varying of the sampling time or phase of said electrical signals includes operating switching circuitry operatively connected to said second plurality of said transducers.

18. (original) The method defined in claim 13 wherein said carrier is rigid, further comprising disposing a flexible fluid-filled bag between the patient and said carrier and transmitting said first pressure waves and receiving said second pressure

waves through said fluid filled flexible bag.

19. (original) The method defined in claim 13, further comprising varying said frequency to facilitate collection of three-dimensional structural data pertaining to tissue structures at different depths in the patient.

20. (original) The method defined in claim 13, further comprising generating an image of the internal tissues of the patient on at least one display.

21. (original) The method defined in claim 13, further comprising maintaining said transducers in substantially fixed positions relative to one another during:

the supplying of said first plurality of said transducers with said electrical signals;

the receiving, via said second plurality of said transducers, of said second pressure waves; and

the performing of said 3D volumetric data acquisition and imaging of said internal tissue structures.

22-30. (canceled)

31. (currently amended) A medical method comprising:

providing a carrier holding a multiplicity of electromechanical transducers

defining respective data gathering apertures;

placing said carrier and a patient adjacent to one another so that said transducers are disposed in effective pressure-wave-transmitting contact with the patient;

supplying a first plurality of said transducers with electrical signals of at least one pre-established ultrasonic frequency to produce first pressure waves in the patient;

receiving, via a second plurality of said transducers, second pressure waves produced at internal tissue structures of the patient in response to said first pressure waves; and

performing electronic 3D volumetric data acquisition and imaging of said internal tissue structures by analyzing signals generated by said second plurality of said transducers in response to said second pressure waves,

~~at least one of the steps of supplying and receiving~~ the analyzing of signals generated by said second plurality of said transducers including coherently combining structural data from the respective data-gathering apertures,

said carrier including a plurality of rigid substrates containing said data-gathering apertures, the coherently combining of structural data from the respective data-gathering apertures including determining relative positions and orientations of said substrates relative to one another,

the determining of relative positions and orientations of said substrates including executing computations according to a self-cohering algorithm.

32. (canceled)

33. (currently amended) The method defined in claim ~~[[32]]~~ 31 wherein each of said substrates is provided with a plurality of point scatterers, the determining of relative positions and orientations of said substrates including periodically scanning said point scatterers with ultrasonic pressure waves and calculating instantaneous positions of said point scatterers.

34. (original) The method defined in claim 33 wherein the determining of relative positions and orientations of said carriers includes executing computations according to a self-cohering algorithm.

35. (original) The method defined in claim 32 wherein the determining of relative positions and orientations of said carriers includes periodically energizing at some of said transducers with at least one predetermined electrical frequency and calculating instantaneous positions of the transducers so energized.

36-45. (canceled)

46. (currently amended) A medical method comprising:
providing a carrier holding a multiplicity of electromechanical transducers
arranged in a plurality of arrays each taken from the group consisting of 1D and 1.5D
arrays;

placing said carrier and a patient adjacent to one another so that said transducers are disposed in effective pressure-wave-transmitting contact with the patient;

supplying a first plurality of said transducers with electrical signals of at least one pre-established ultrasonic frequency to produce first pressure waves in the patient;

receiving, via a second plurality of said transducers, second pressure waves produced at internal tissue structures of the patient in response to said first pressure waves;

executing the supplying and receiving steps to ~~organize said transducers into multiple data-gathering apertures effectuating an~~ effectuate a two-dimensional electronic scanning of said internal tissue structures ~~in elevation, where one of two electronic scanning dimensions accords with or is defined by a length dimension of each of said arrays and [[an]] where a second of said~~ electronic scanning of said internal tissue structures ~~in azimuth~~ dimensions accords with or is defined by a width dimension of said arrays, thereby acquiring electronic 3D volumetric data; and

performing electronic 3D imaging of said internal tissue structures in part by analyzing signals generated by said second plurality of said transducers in response to said second pressure waves.

47. (currently amended) A medical scanning method comprising:

providing a plurality of electromechanical sensors disposed in data-gathering arrays or apertures on respective rigid substrates mounted to a flexible carrier;

disposing said carrier in relation to a patient;

after the disposing of said carrier, activating said sensors to effectuate a solely electronic ultrasonic-wave scan of internal organic structures of the patient resulting in encoded three-dimensional structural data pertaining to the internal organic structures, the activating of said sensors including exciting said sensors to define ~~multiple~~ said data-gathering arrays or apertures;

the activating of said sensors including generating a plurality of tissue-scanning beams via respective ones of said data-gathering arrays or apertures to capture or produce structural data pertaining to said internal organic structures and combining the structural data from said data-gathering arrays or apertures; and

operating on the data from said apertures to produce an electronically encoded three-dimensional model or analog of said internal organic structures.

48. (previously presented) The method defined in claim 48 wherein said three dimensional model is produced from said data alone.

49. (previously presented) The method defined in claim 48, further comprising generating an image of at least one of said internal structures from said model.